

CLAIMS: (US, CA)

1. A diffraction grating alignment method for  
5 aligning the longitudinal direction of grooves of a  
diffraction grating in a predetermined direction, the method  
comprising;  
detecting a diffracted light pattern sent from the  
diffraction grating; and  
10 displacing the diffraction grating such that an  
arranging direction obtained from the diffracted light pattern  
is aligned in the predetermined direction.

2. The diffraction grating alignment method according  
15 to claim 1, wherein detecting the diffracted light pattern  
utilizes a screen that faces the diffraction grating, wherein  
the diffracted light pattern is projected on the screen,  
wherein a reference line extends in the predetermined  
direction on the screen, and wherein an angle between the  
20 arranging direction obtained from diffracted light pattern and  
the reference line is detected.

3. The diffraction grating alignment method according  
to claim 1, wherein detecting the diffracted light pattern  
25 includes:  
reading the diffracted light pattern;  
displaying an image of the read diffracted light  
pattern; and  
calculating an angle between a reference line and an  
30 arranging direction obtained from the diffracted light pattern,  
wherein the reference line extends in the predetermined  
direction.

4. The diffraction grating alignment method according  
35 to claim 1, wherein detecting the diffracted light pattern

includes:

reading the diffracted light pattern;

recognizing the diffracted light pattern based on data  
of the read diffracted light pattern and analyzing the  
5 relative relationship between the diffracted light pattern and  
the predetermined direction; and

displacing the diffraction grating based on a result  
obtained by analyzing the relative relationship.

10 5. A diffraction grating alignment apparatus  
comprising:

a placing device for placing a diffraction grating;

a displacing device for displacing the diffraction  
grating located on the placing device;

15 a light source for radiating light on the diffraction  
grating located on the placing device;

a detecting device for detecting a diffracted light  
pattern sent from the diffraction grating based on radiation  
of light from the light source; and

20 a control device for controlling the displacing device  
to displace the diffraction grating such that the direction of  
an arranging direction obtained from the diffracted light  
pattern detected by the detecting device is aligned in the  
predetermined direction.

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6. The diffraction grating alignment apparatus  
according to claim 5, wherein the detecting device is a screen  
that faces the diffraction grating, wherein the diffracted  
light pattern is projected on the screen, and wherein a  
30 reference line is located on the screen to extend in the  
predetermined direction.

7. The diffraction grating alignment apparatus  
according to claim 5,  
35 wherein the detecting device includes an image reading

device for reading the diffracted light pattern and a display device for displaying an image of the diffracted light pattern read by the image reading device, and

wherein the display device displays a reference line  
5 with the diffracted light pattern, and wherein the reference line extends along the predetermined direction.

8. The diffraction grating alignment apparatus according to claim 6,

10 wherein the placing device is a turntable, and wherein the displacing device is a rotary motor for rotating the turntable, and

wherein the control device controls the rotary motor based on a switch, and wherein the switch is manipulated to  
15 rotate the rotary motor in forward and reverse directions.

9. The diffraction grating alignment apparatus according to claim 5,

wherein the detecting device includes an image reading  
20 device and an analyzing device, wherein the image reading device reads the diffracted light pattern, wherein the analyzing device recognizes the diffracted light pattern based on data of diffracted light pattern read by the image reading device, and wherein the analyzing device analyzes the relative  
25 relationship between the diffracted light pattern and the predetermined direction, and

wherein the control device controls the displaying device based on an analysis result of the analyzing device to displace the diffraction grating.

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10. The diffraction grating alignment apparatus according to claim 9,

wherein the placing device is a turntable, and wherein the displacing device is a rotary motor for rotating the  
35 turntable, and

wherein the control device controls the rotary motor based on the analysis result of the analyzing device.

11. The diffraction grating alignment apparatus  
5 according to claim 5, further comprising a machining device for machining the diffraction grating that is aligned on the placing device.

12. The diffraction grating alignment apparatus  
10 according to claim 11, wherein the machining device is a cutter.

13. The diffraction grating alignment apparatus  
according to claim 5, wherein the light source is a laser  
15 light source, and wherein the diffracted light pattern includes a plurality of diffracted lights.

14. The diffraction grating alignment apparatus  
according to claim 9, wherein the image reading device is a  
20 CCD camera.